

User Guide



Wireless

Notebook Adapter



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FCC STATEMENT

The Wireless Notebook Adapter has been tested and complies with the specifications for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used according to the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which is found by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment or devices
- Connect the equipment to an outlet other than the receiver's
- Consult a dealer or an experienced radio/TV technician for assistance

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Chapter 1: Introduction

The Network Everywhere™ Wireless Notebook Adapter

Connect your notebook computer to a wireless network with the Network Everywhere Wireless Notebook Adapter. The included Setup Wizard will walk you through configuring the adapter and your network's settings, step by step. Then just slide it into your notebook's PC Card slot and enjoy network access with your notebook computer, while retaining true mobility.

Once you're connected, you can keep in touch with your e-mail, access the Internet, and share files and other resources such as printers and network storage with other computers on the network, wherever you wander. At home, you can surf the web or use instant messaging to chat with friends while sitting out on the patio. You'll also be able to connect with any of the growing number of public wireless "hotspots" springing up in coffee shops, airport lounges, hotels and convention centers.

The Network Everywhere Wireless Notebook Adapter is fully compliant with the 802.11b wireless network standard, transferring data at up to 11Mbps in the 2.4GHz radio band. If distance or interference starts to degrade the signal, the Adapter automatically drops down to slower speeds, to keep you connected if at all possible. Wireless communications are protected by up to 128-bit encryption, so your data stays secure.

Get connected and stay mobile with the Network Everywhere Wireless Notebook Adapter.

Features

- IEEE 802.11b compliant
- Auto fallback
- RF Output 18dBm (64mW)
- 64/128-bit WEP
- Cardbus Interface
- Easy-to-use Setup Wizard and WLAN Monitor Utility

LEDs



Figure 3-1

Power	<i>Green.</i> The Power LED lights up when the Adapter is powered on.
Act	<i>Green.</i> The Link LED blinks when the Adapter is receiving and transmitting network data.

Chapter 2: Planning Your Wireless Network

Network Topology

A wireless local area network (WLAN) is exactly like a regular local area network (LAN), except that each computer in the WLAN uses a wireless device to connect to the network. Computers in a WLAN share the same frequency channel and SSID, which is an identification name for wireless devices.

Ad-Hoc versus Infrastructure Mode

Unlike wired networks, wireless networks have two different modes in which they may be set up: **infrastructure** and **ad-hoc**. An infrastructure configuration is a WLAN and wired LAN communicating to each other through an access point. An ad-hoc configuration is wireless-equipped computers communicating directly with each other. Choosing between these two modes depends on whether or not the wireless network needs to share data or peripherals with a wired network or not.

If the computers on the wireless network need to be accessed by a wired network or need to share a peripheral, such as a printer, with the wired network computers, the wireless network should be set up in **infrastructure** mode. (See Figure 2-1.) The basis of infrastructure mode centers around an *access point*, which serves as the main point of communications in a wireless network.

Access points transmit data to PCs equipped with wireless network cards and adapters, which can *roam* within a certain radial range of the access point. Multiple access points can be arranged to work in succession to extend the roaming range, and can be set up to communicate with your Ethernet (wired) hardware as well.



Figure 2-1

If the wireless network is relatively small and needs to share resources only with the other computers on the wireless network, then the **ad-hoc** mode can be used. (See Figure 2-2.) Ad-hoc mode allows computers equipped with wireless transmitters and receivers to communicate directly with each other, eliminating the need for an access point. The drawback of this mode is that, in Ad-Hoc mode, wireless-equipped computers are not able to communicate with computers on a wired network. And, of course, communication between the wireless-equipped computers is limited by the distance and interference directly between them.



Figure 2-2

Chapter 3: Using the Setup Wizard

Before You Start

The Network Everywhere™ Wireless Notebook Adapter comes with an automated software installation procedure for Windows 98, Me, and 2000. This automatically installs the drivers and Configuration Utility *before* you insert the Adapter into your PC, so there's no searching for the location of drivers. *Again, this step is taken before inserting the Adapter into your PC.*



Important for Windows XP users: Do **NOT** run the Wireless Notebook Adapter's Setup Wizard. See "Chapter 4: Driver Installation and Configuration for Windows XP." If the Setup Wizard runs automatically after the Setup Wizard CD-ROM has been inserted, click the **Exit** tab."

Running the Setup Wizard

1. Before installing your adapter, insert the Setup Wizard CD into your CD-ROM drive. Unless you have deactivated the auto-run feature of Windows, the screen shown in Figure 3-1 should appear automatically. If it does not, this means the autorun is not functioning. Start the Setup Wizard manually by clicking the **Start** button, selecting **Run**, and typing **d:\setup.exe** (where "D" is your PD's CD-ROM drive).



Figure 3-1

Click the **Install** button to run the Setup Wizard or the **Exit** button to close this screen. You opened this User Guide by clicking the **User Guide** button.

2. The following screen, shown in Figure 3-2, will display the Network Everywhere End-User License Agreement. Read this and click the **Next** button to proceed or the **Cancel** button to close the Setup Wizard.



Figure 3-2

3. When the screen shown in Figure 3-3 appears, you will choose your network topology, as described in Chapter 2. **Ad-Hoc** mode is used for a simple peer-to-peer network and allows the sharing of local resources only between Wireless Notebook Adapters without needing an access point or wireless router. The **Infrastructure** mode allows a wireless network to be integrated into an existed, wired network through an access point or wireless router.

With your network topology selected, enter your wireless network's SSID. This is a type of network name and must be identical for all points in your network. *It is case sensitive and must not exceed 32 characters.* Enter this in the SSID field.

Once these settings are made, click the **Next** button to proceed or the **Back** button to return to the previous screen.



Figure 3-3

4. The **Channel** setting that appears on the next screen, shown in Figure 3-4, specifies the channel used in wireless communication and should be set to the same channel as the other points in the wireless network. This setting can only be adjusted in Ad-Hoc mode.



Figure 3-4

Once this setting is made, click the **Next** button to proceed or the **Back** button to return to the previous screen.

5. Review your settings on the following screen, shown in Figure 3-5. If they are correct, click the **Next** button to proceed or the **Back** button to change settings on a previous screen.



Figure 3-5

6. Lastly, you will see the *Congratulations* screen, showing that installation of the Adapter's drivers and software has been installed. Click the **Finish** button to close the Setup Wizard.

Chapter 4: Driver Installation and Configuration for Windows XP

Overview

After inserting the Wireless Notebook Adapter into your computer, you will install the driver and configure the Adapter.



Important for Windows XP users: Do **NOT** run the Wireless Notebook Adapter's Setup Wizard. If the Setup Wizard runs automatically after the Setup Wizard CD-ROM has been inserted, click the **Exit** tab.

Driver Installation for Windows XP

1. Windows XP will automatically detect the Adapter. Insert the Setup Wizard CD-ROM into your CD-ROM drive. Click the radio button next to **Install the software automatically (Recommended)**, as shown in Figure 4-1, and click the **Next** button.



Figure 4-1

Wireless Notebook Adapter

2. After Windows has finished installing the driver, click the **Finish** button, as shown in Figure 4-2.



Figure 4-2

You have now completed the driver installation for the Wireless Notebook Adapter. To configure the Adapter, proceed to the next section, “Windows XP Wireless Zero Configuration.”

Windows XP Wireless Zero Configuration



Important for Windows XP users: Windows XP has a built-in configuration tool. Use the Windows XP Wireless Zero Configuration (in the system tray at the bottom of your screen) to configure the Adapter.

1. After installing the Adapter, the Windows XP Wireless Zero Configuration icon will appear in your computer's system tray (see Figure 4-3). Double-click the icon.



Figure 4-3

2. The screen that appears (Figure 4-4) will show any available wireless network. Select a network, and then click the **Connect** button.



Figure 4-4

To find the WEP encryption key settings of the other wireless devices in your network, such as an Access Point, you may use any device's web-based utility to check the WEP encryption screen for the correct key entries. If you are using other manufacturers' access points, refer to their documentation for more information about WEP encryption.



Note: Windows XP does not support the use of a passphrase. Enter the exact WEP key used by your access point.

3. The screen in Figure 4-5 will appear if your connection is active.



Figure 4-5

For more information about WEP, refer to your access point's user guide, or visit www.networkeverywhere.com.

For more information about wireless networking on a Windows XP computer, click **Start** and then **Help and Support**. Enter the keyword **wireless** in the field provided, and press the **Enter** key.

The installation of the Wireless Notebook Adapter is complete.

Chapter 5: Using the WLAN Monitor for Windows 98, Me, and 2000

Overview

While the Wireless Notebook Adapter can be set up with the Setup Wizard and Window XP's Zero Configuration Tool, the Adapter also comes with a WLAN (for Wireless Network) Monitor tool. The WLAN Monitor can be used to check link information, search for available wireless networks, or make additional configuration changes.



Important for Windows XP users: Windows XP has a built-in configuration tool. Use the Windows XP Wireless Zero Configuration (in the system tray at the bottom of your screen) to configure the Adapter. See "Chapter 4: Driver Installation and Configuration for Windows XP."

Starting the WLAN Monitor

After installing the Adapter, the WLAN Monitor icon will appear in your system tray (shown in Figure 5-1). Double-click this icon to open the WLAN Monitor.



Figure 5-1

The *Link Information* screen, shown in Figure 5-2, will appear, displaying the settings for your current wireless connection. To search for available wireless networks, click the **Site Survey** tab. To perform configuration changes, click the **Profiles** tab.

Link Information



Figure 5-2

The *Link Information* screen graphically displays the Adapter's current status, such as the strength of the wireless signal and quality of the wireless connection. Furthermore, the type of network to which you're connected is displayed (Figure 5-2 shows a connection to an Infrastructure network). For more detailed information about the Adapter's performance, click the **More Information** button.

This will display the following information (shown in Figure 5-3):

TCP/IP Setting

IP Address - This displays the Adapter's IP Address.

Subnet Mask - This displays the Adapter's Subnet Mask.

Default Gateway - This displays the Adapter's Default Gateway address.

DNS - This displays the Adapter's DNS address.

DHCP - This displays the status of the DHCP client.



Figure 5-3

Wireless Network Status

State - This shows the status of the wireless network connection.

SSID - This is the SSID of the wireless network.

Network Type - This is the wireless mode currently in use.

Transfer Rate - The data transfer rate of the current connection is displayed here.

Channel - The channel to which the wireless network devices are set is displayed here.

WEP - This displays the status of the WEP encryption security feature.

MAC - This is the MAC address of the wireless network's access point.

Signal Strength - The Signal Strength bar indicates signal strength, from 0 to 100%.

Link Quality - The Link Quality bar indicates the quality of the wireless network connection, from 0 to 100%.

Click the **X** (Close) button in the upper right corner to exit the WLAN Monitor.

Site Survey

The *Site Survey* screen, shown in Figure 5-4, displays a list of infrastructure and ad-hoc networks available for connection.

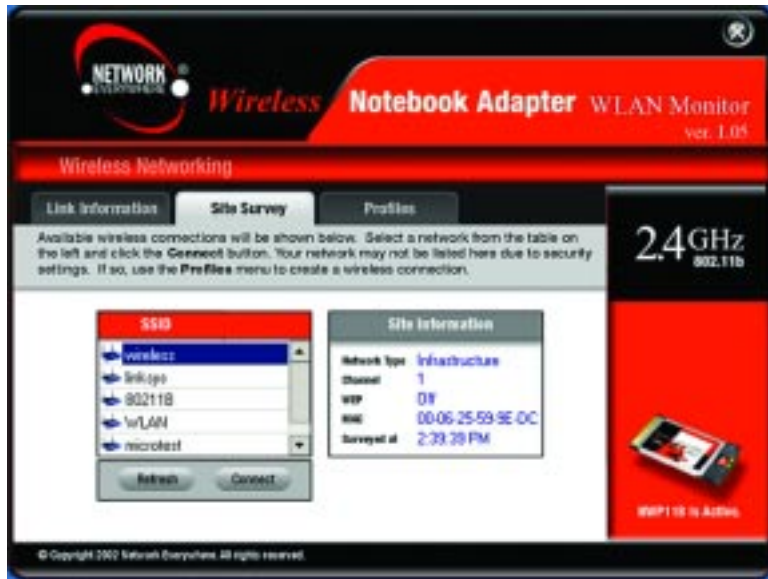


Figure 5-4

SSID - The SSID of the wireless network is displayed here.

Site Information

Network Type - This shows the wireless mode currently in use.

Channel - The channel to which the wireless network devices are set is shown here.

WEP - The status of the WEP encryption security feature is shown here.

MAC - This is the MAC address of the wireless network's access point.

Surveyed at - This displays the time at which the wireless network was scanned.

Refresh - Click the **Refresh** button to perform a new search for wireless devices.

Connect - To connect to one of the networks on the list, select the wireless network, and click the **Connect** button to connect. If the wireless network has WEP encryption enabled, you will see the screen shown in Figure 5-5.

Wireless Notebook Adapter

In the *WEP* drop-down box, select the type of WEP encryption used by the wireless network: **64-bit** or **128-bit WEP**.

If the wireless network uses a passphrase, enter the passphrase in the *Passphrase* field. If the wireless network uses a WEP key, enter the WEP key in the *Key 1* field.



Figure 5-5

Click the **OK** button to complete the network connection and return to the *Site Survey* screen, or click the **Cancel** button to cancel the network connection and return to the *Site Survey* screen.

On the *Site Survey* screen, click the **X** (Close) button in the upper right corner to exit the WLAN Monitor.

Profiles

The *Profiles* screen, shown in Figure 5-6, lets you save different configuration profiles for different network setups. You can also import or export profiles. The default profile holds the initial configuration saved when you installed the Adapter.

Profile - This shows the name of the connection profile.

SSID - The wireless network's SSID, as set in the connection profile, is displayed here.

Profile Information

Network Type - This shows the wireless mode currently in use.

Transfer Rate - The data transfer rate of the current connection: *1Mbps*, *2Mbps*, *1 or 2Mbps*, *5.5Mbps*, *11Mbps*, or *Auto* (in *Auto* mode, the Adapter dynamically shifts to the fastest data transfer rate possible at any given time).

Channel - The channel to which the wireless network devices are set is shown here.

WEP - The status of the WEP encryption security feature is displayed here.

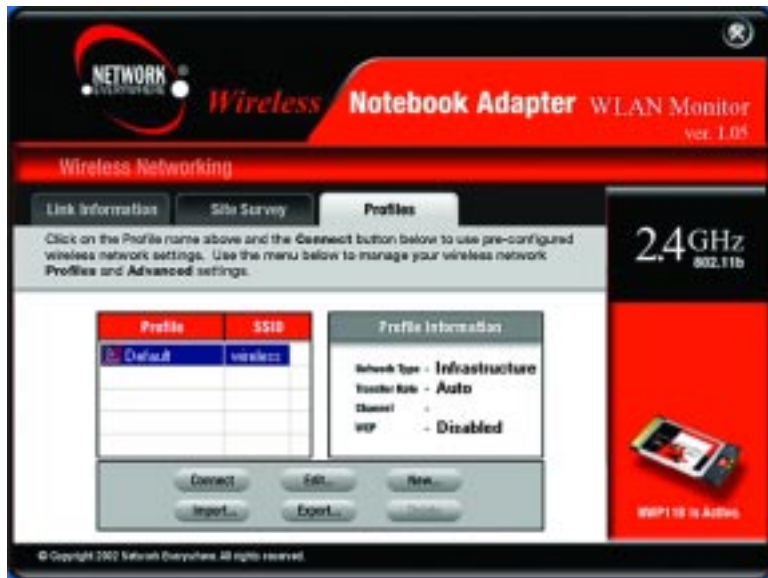


Figure 5-6

- **Connect** - To connect to a wireless network using a specific profile, select the profile, and click the **Connect** button. If the wireless network has WEP encryption enabled, you will see the screen shown in Figure 5-7.

In the *WEP* drop-down box, select the type of WEP encryption used by the wireless network: **64-bit** or **128-bit WEP**.

If the wireless network uses a passphrase, enter the passphrase in the *Passphrase* field. If the wireless network uses a WEP key, enter the WEP key in the *Key 1* field.

Click the **OK** button to complete the network connection and return to the *Profiles* screen, or click the **Cancel** button to cancel the network connection and return to the *Profiles* screen.



Figure 5-7

- **Edit** - Select a profile, and click the **Edit** button to change an existing profile.
- **New** - Click the **New** button to create a new profile. See the next section, "Creating a New Profile."
- **Import** - (Shown in Figure 5-8.) Click the **Import** button to import a profile that has been saved in another location. Select the appropriate file, and click the **Open** button.



Figure 5-8

- **Export** - (Shown in Figure 5-9.) Select the profile you want to save in a different location, and click the **Export** button. Direct Windows to the appropriate folder, and click the **OK** button.



Figure 5-9



Note: If you want to export more than one profile, you have to export them one at a time.

- **Delete** - Click the **Delete** button to delete a profile.

Click the **X** (Close) button in the upper right corner to exit the WLAN Monitor.

Creating a New Profile

New profiles can be created in the following manner:

1. On the *Profiles* screen (Figure 5-6), click the **New** button to create a new profile.
2. Enter a name for the new profile on the screen shown in Figure 5-10.



Figure 5-10

3. The *Choose a network type* screen, shown in Figure 5-11, shows a choice of two wireless modes. Click the **Infrastructure Mode** radio button if you want your wireless computers to communicate with computers on your wired network via a wireless access point. Click the **Ad-Hoc Mode** radio button if you want multiple wireless computers to communicate directly with each other. Then, enter your wireless network's **SSID**. Click the **Next** button to continue or the **Back** button to return to the previous screen.



Figure 5-11

Infrastructure Mode - This mode allows wireless and wired networks to communicate through an access point.

Ad-Hoc Mode - This mode allows wireless-equipped computers to communicate directly with each other. No access point is used.

SSID - The SSID is the unique name shared by all devices in a wireless network. The SSID must be identical for all devices in the wireless network. It is case-sensitive and must not exceed 32 characters (use any of the characters on the keyboard). Make sure this setting is the same for all devices in your wireless network.

4. The *Network Settings* screen, shown in Figure 5-12, will appear next. If your network has a DHCP server, click the radio button next to **Obtain an IP address automatically (DHCP)**. Click the **Next** button to continue or the **Back** button to return to the previous screen.

If your network does not have a DHCP server, click the radio button next to **Specify the IP address**. Then, enter the following information:

IP Address - This IP Address must be unique to your network. Enter the IP Address in this format: **xxx.xxx.xxx.xxx** (the x's represent your actual IP Address).

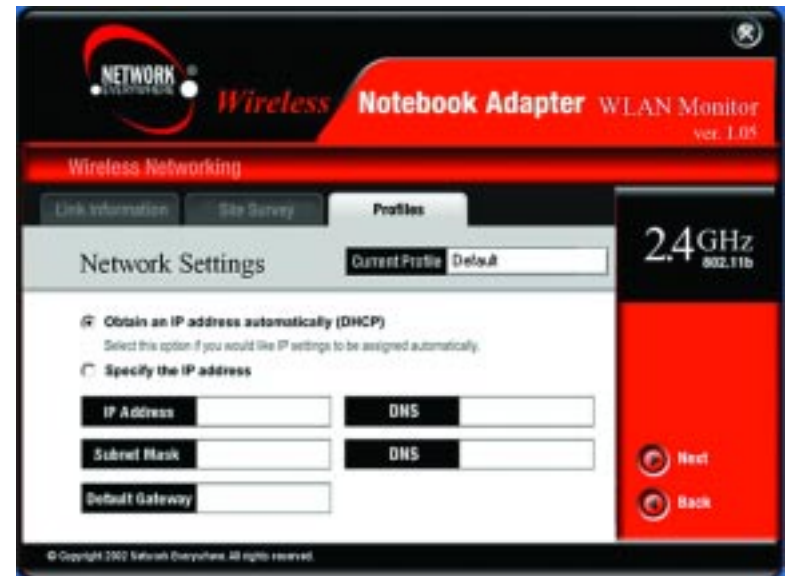


Figure 5-12

Subnet Mask - The Adapter's Subnet Mask must be the same as your wired network's Subnet Mask. Enter the Subnet Mask in this format: **xxx.xxx.xxx.xxx** (the x's represent your actual Subnet Mask).

Default Gateway - Enter the IP address of your network's Gateway here. Enter the Default Gateway in this format: **xxx.xxx.xxx.xxx** (the x's represent your actual Default Gateway).

DNS - Enter the DNS address of your Ethernet (wired) network here. Enter the DNS address in this format: **xxx.xxx.xxx.xxx** (the x's represent your actual DNS address).

Click the **Next** button to continue or the **Back** button to return to the previous screen.

- The *Security Settings* screen, shown in Figure 5-13, will appear next. Set the Wired Equivalent Privacy (WEP) encryption for your wireless network by selecting a WEP configuration method.

WEP (Disabled/64-bit WEP/128-bit WEP) - If you do not want to use WEP encryption, choose **Disabled**. Then click the **Next** button to continue or the **Back** button to return to the previous screen.



Figure 5-13

To use WEP encryption, select **64-bit** or **128-bit WEP** from the drop-down menu (recommended).

If you select 64-bit or 128-bit WEP, you have two choices. Enter the passphrase of your wireless network in the *Passphrase* field, or enter the WEP key of your wireless network in the *Key 1* field. Click the **Next** button to continue or the **Back** button to return to the previous screen.

Passphrase - This passphrase must match the passphrase of your wireless network. This is the code used when logging a wireless device onto the wireless network. The passphrase is case-sensitive and should not be longer than 16 alphanumeric characters. Based upon the passphrase created by you, WEP key settings are automatically generated. This passphrase is compatible only with other Linksys wireless products.

Key 1 - This WEP key must match the WEP key of your wireless network. If you are using 64-bit WEP encryption, then the key must consist of exactly **10** hexadecimal characters in length. If you are using 128-bit WEP encryption, then the key must consist of exactly **26** hexadecimal characters in length. Valid hexadecimal characters are "0" to "9" and "A" to "F".

- The *Confirm New Settings* screen, shown in Figure 5-14, will appear next. To save the new settings, click the **Yes** button. To cancel the settings and return to the *Profiles* screen, click the **No** button. To edit the new settings, click the **Back** button.



Figure 5-14

7. The *Congratulations* screen will appear next. Click **Activate new settings now** to implement the new settings immediately and return to the *Link Information* screen. Click **Activate new settings later** to keep the current settings active and return to the *Profiles* screen.



Figure 5-13

You have successfully created a connection profile. Click the **X (Close)** button in the upper right corner to exit the WLAN Monitor.

Appendix A: Troubleshooting

This chapter provides solutions to problems usually occurring during the installation and operation of the Wireless Notebook Adapter. Read the description below to solve your problems. If you can't find an answer here, check the Linksys website at www.linksys.com.

Common Problems and Solutions

1. My computer does not recognize the Wireless Notebook Adapter.

Make sure that the Wireless Notebook Adapter is properly inserted into the Cardbus slot. You can try inserting the Adapter both ways if you're unsure if it's inserted correctly. The Adapter will slide in further when it is correct.

2. The Wireless Notebook Adapter does not work properly.

- Reinsert the Wireless Notebook Adapter into your notebook's Cardbus slot. A beep should be heard if the Adapter is properly inserted.
- For non-Windows environments, make sure that a PCMCIA card service driver is installed on your PC.
- Open the **Control Panel** and click on the **PC Card**. Check whether it has a PCMCIA card in one of the sockets or not. If you find the Wireless Notebook Adapter in one of the sockets, it means the Adapter has been detected properly. If you see a yellow question mark, the resources are conflicting.
- Right-click on **My Computer** and select **Properties**. Select the device manager and click the **Network Adapter**. You will find the Wireless Notebook Adapter if it is installed successfully. If you see the yellow exclamation mark, the resources are conflicting. Click **PCMCIA card** and then click **PCMCIA card service**. You will see the status of the Wireless Notebook Adapter. If there is a yellow question mark, please check the following:
 - Make sure that your notebook has a free IRQ.
 - Make sure that you have inserted the Adapter and installed the proper driver.

If the Wireless Notebook Adapter does not function after attempting the above steps, remove the Adapter and do the following:

- Uninstall the driver software from your PC.
- Restart your PC and repeat the hardware and software installation as specified in this User Guide.

3. I cannot communicate with the other computers linked via the Ethernet in the Infrastructure configuration.

- Make sure that the notebook PC to which the Wireless Notebook Adapter is associated is powered on.
- Make sure that your Wireless Notebook Adapter is configured on the same channel and with the same security options as the other computers in the Infrastructure configuration.

Frequently Asked Questions

Can I run an application from a remote computer over the wireless network?

This will depend on whether or not the application is designed to be used over a network. Consult the application's documentation to determine if it supports operation over a network.

Can I play multiplayer games with other users of the wireless network?

Yes, as long as the game supports multiple players over a LAN (local area network). Refer to the game's documentation for more information.

What is the IEEE 802.11b standard?

The IEEE 802.11b Wireless LAN standards subcommittee formulates standards for the industry. The objective is to enable wireless LAN hardware from different manufacturers to communicate.

What IEEE 802.11 features are supported?

The product supports the following IEEE 802.11 functions:

- CSMA/CA plus Acknowledge protocol
- Multi-Channel Roaming
- Automatic Rate Selection
- RTS/CTS feature
- Fragmentation
- Power Management

What is Ad-hoc?

An Ad-hoc wireless LAN is a group of computers, each with a Wireless Notebook Adapter, connected as an independent wireless LAN. An Ad-hoc wireless LAN is applicable at a departmental scale for a branch or SOHO operation.

What is Infrastructure?

An integrated wireless and wired LAN is called an Infrastructure configuration. Infrastructure is applicable to enterprise scale for wireless access to a central database, or wireless application for mobile workers.

What is Roaming?

Roaming is the ability of a portable computer user to communicate continuously while moving freely throughout an area greater than that covered by a single Wireless Network Access Point.

To achieve true seamless connectivity, the wireless LAN must incorporate a number of different functions. Each node and Wireless Network Access Point, for example, must always acknowledge receipt of each message. Each node must maintain contact with the wireless network even when not actually transmitting data. Achieving these functions simultaneously requires a dynamic RF networking technology that links Wireless Network Access Points and nodes. In such a system, the user's end node undertakes a search for the best possible access to the system. First, it evaluates such factors as signal strength and quality, as well as the message load currently being carried by each Wireless Network Access Point and the distance of each Wireless Network Access Point to the wired backbone. Based on that information, the node next selects the right Wireless Network Access Point and registers its address. Communications between end node and host computer can then be transmitted up and down the backbone.

As the user moves on, the end node's RF transmitter regularly checks the system to determine whether it is in touch with the original Wireless Network Access Point or whether it should seek a new one. When a node no longer receives acknowledgment from its original Wireless Network Access Point, it undertakes a new search. Upon finding a new Wireless Network Access Point, it then re-registers, and the communication process continues.

What is BSS ID?

A specific Ad-hoc LAN is called a Basic Service Set (BSS). Computers in a BSS must be configured with the same BSS ID.

What is ESSID?

An Infrastructure configuration could also support roaming capability for mobile workers. More than one BSS can be configured as an Extended Service Set (ESS). Users within an ESS could roam freely between BSSs while maintaining a continuous connection to the wireless network stations and Wireless Network Access Points.

What is ISM band?

The FCC and their counterparts outside of the U.S. have set aside bandwidth for unlicensed use in the ISM (Industrial, Scientific and Medical) band. Spectrum in the vicinity of 2.4 GHz, in particular, is being made available

worldwide. This presents a truly revolutionary opportunity to place convenient high speed wireless capabilities in the hands of users around the globe.

What is Spread Spectrum?

Spread Spectrum technology is a wideband radio frequency technique developed by the military for use in reliable, secure, mission-critical communications systems. It is designed to trade off bandwidth efficiency for reliability, integrity, and security. In other words, more bandwidth is consumed than in the case of narrowband transmission, but the trade-off produces a signal that is, in effect, louder and thus easier to detect, provided that the receiver knows the parameters of the spread-spectrum signal being broadcast. If a receiver is not tuned to the right frequency, a spread-spectrum signal looks like background noise. There are two main alternatives, Direct Sequence Spread Spectrum (DSSS) and Frequency Hopping Spread Spectrum (FHSS).

What is DSSS? What is FHSS? And what are their differences?

Frequency Hopping Spread Spectrum (FHSS) uses a narrowband carrier that changes frequency in a pattern that is known to both transmitter and receiver. Properly synchronized, the net effect is to maintain a single logical channel. To an unintended receiver, FHSS appears to be short-duration impulse noise. Direct Sequence Spread Spectrum (DSSS) generates a redundant bit pattern for each bit to be transmitted. This bit pattern is called a chip (or chipping code). The longer the chip, the greater the probability that the original data can be recovered. Even if one or more bits in the chip are damaged during transmission, statistical techniques embedded in the radio can recover the original data without the need for retransmission. To an unintended receiver, DSSS appears as low power wideband noise and is rejected (ignored) by most narrowband receivers.

Would information be intercepted while transmitting on air?

WLAN features two-fold protection in security. On the hardware side, as with Direct Sequence Spread Spectrum technology, it has the inherent security feature of scrambling. On the software side, the WLAN series offers the encryption function (WEP) to enhance security and access control. Users can set it up depending upon their needs.

Can Instant Wireless™ products support file and printer sharing?

Instant Wireless™ products perform the same function as LAN products. Therefore, Instant Wireless™ products can work with Netware, Windows NT/2000, or other LAN operating systems to support printer or file sharing.

What is WEP?

WEP is Wired Equivalent Privacy, a data privacy mechanism based on a 40 bit shared key algorithm, as described in the IEEE 802.11 standard.

Appendix B: Glossary

802.11b - One of the IEEE standards for wireless networking hardware. Products that adhere to a specific IEEE standard will work with each other, even if they are manufactured by different companies. The 802.11b standard specifies a maximum data transfer rate of 11Mbps, an operating frequency of 2.4GHz, and WEP encryption for security. 802.11b networks are also referred to as Wi-Fi networks.

Adapter - Printed circuit board that plugs into a PC to add to capabilities or connectivity to a PC. In a networked environment, a network interface card (NIC) is the typical adapter that allows the PC or server to connect to the intranet and/or Internet.

Ad-hoc Network - An ad-hoc network is a group of computers, each with a wireless adapter, connected as an independent 802.11 wireless LAN. Ad-hoc wireless computers operate on a peer-to-peer basis, communicating directly with each other without the use of an access point. Ad-hoc mode is also referred to as an Independent Basic Service Set (IBSS) or as peer-to-peer mode, and is useful at a departmental scale or SOHO operation.

Auto fall-back - A feature provided by some wireless products to increase connection reliability. Automatic fall-back enables a device to dynamically shift between various data transfer rates. It works by decreasing the data transfer rate when interference increases, distance increases, and other factors undermine signal strength and quality.

Backbone - The part of a network that connects most of the systems and networks together and handles the most data.

Bandwidth - The transmission capacity of a given facility, in terms of how much data the facility can transmit in a fixed amount of time; expressed in bits per second (bps).

Bit - A binary digit. The value - 0 or 1-used in the binary numbering system. Also, the smallest form of data.

Boot - To cause the computer to start executing instructions. Personal computers contain built-in instructions in a ROM chip that are automatically executed on startup. These instructions search for the operating system, load it and pass control to it.

BSS (Basic Service Set) - An infrastructure network connecting wireless devices to a wired network using a single access point.

Cardbus - A high-speed peripherals interface for notebook PCs that delivers 32-bit performance based on PCI bus architecture.

CSMA/CA (Carrier Sense Multiple Access/Collision Avoidance) - In local area networking, this is the CSMA technique that combines slotted time-division multiplexing with carrier sense multiple access/collision detection (CSMA/CD) to avoid having collisions occur a second time. This works best if the time allocated is short compared to packet length and if the number of situations is small.

CTS (Clear To Send) - An RS-232 signal sent from the receiving station to the transmitting station that indicates it is ready to accept data.

Database - A database is a collection of data that is organized so that its contents can easily be accessed, managed, and updated.

Default Gateway - The routing device used to forward all traffic that is not addressed to a station within the local subnet.

DHCP (Dynamic Host Configuration Protocol) - A protocol that lets network administrators manage centrally and automate the assignment of Internet Protocol (IP) addresses in an organization's network. Using the Internet's set of protocol (TCP/IP), each machine that can connect to the Internet needs a unique IP address. When an organization sets up its computer users with a connection to the Internet, an IP address must be assigned to each machine. Without DHCP, the IP address must be entered manually at each computer and, if computers move to another location in another part of the network, a new IP address must be entered. DHCP lets a network administrator supervise and distribute IP addresses from a central point and automatically sends a new IP address when a computer is plugged into a different place in the network.

DHCP uses the concept of a "lease" or amount of time that a given IP address will be valid for a computer. The lease time can vary depending on how long a user is likely to require the Internet connection at a particular location. It's espe-

cially useful in education and other environments where users change frequently. Using very short leases, DHCP can dynamically reconfigure networks in which there are more computers than there are available IP addresses.

DHCP supports static addresses for computers containing Web servers that need a permanent IP address.

DNS - The domain name system (DNS) is the way that Internet domain names are located and translated into Internet Protocol (IP) addresses. A domain name is a meaningful and easy-to-remember "handle" for an Internet address.

Driver - A workstation or server software module that provides an interface between a network interface card and the upper-layer protocol software running in the computer; it is designed for a specific NIC, and is installed during the initial installation of a network-compatible client or server operating system.

DSSS (Direct-Sequence Spread Spectrum) - DSSS generates a redundant bit pattern for all data transmitted. This bit pattern is called a chip (or chipping code). Even if one or more bits in the chip are damaged during transmission, statistical techniques embedded in the receiver can recover the original data without the need for retransmission. To an unintended receiver, DSSS appears as low power wideband noise and is rejected (ignored) by most narrowband receivers. However, to an intended receiver (i.e. another wireless LAN endpoint), the DSSS signal is recognized as the only valid signal, and interference is inherently rejected (ignored).

Encryption - A security method that applies a specific algorithm to data in order to alter the data's appearance and prevent other devices from reading the information.

Ethernet - IEEE standard network protocol that specifies how data is placed on and retrieved from a common transmission medium. Has a transfer rate of 10 Mbps. Forms the underlying transport vehicle used by several upper-level protocols, including TCP/IP and XNS.

FHSS (Frequency Hopping Spread Spectrum) - FHSS continuously changes (hops) the carrier frequency of a conventional carrier several times per second according to a pseudo-random set of channels. Because a fixed frequency is not used, and only the transmitter and receiver know the hop patterns, interception of FHSS is extremely difficult.

Fragmentation - Breaking a packet into smaller units when transmitting over a network medium that cannot support the original size of the packet.

Hardware - Hardware is the physical aspect of computers, telecommunications, and other information technology devices. The term arose as a way to distinguish the "box" and the electronic circuitry and components of a computer from the program you put in it to make it do things. The program came to be known as the software.

Hop - The link between two network nodes.

IEEE (The **I**nstitute of **E**lectrical and **E**lectronics **E**ngineers) - The IEEE describes itself as "the world's largest technical professional society, promoting the development and application of electrotechnology and allied sciences for the benefit of humanity, the advancement of the profession, and the well-being of our members."

The IEEE fosters the development of standards that often become national and international standards. The organization publishes a number of journals, has many local chapters, and several large societies in special areas, such as the IEEE Computer Society.

Infrastructure Network - An infrastructure network is a group of computers or other devices, each with a wireless adapter, connected as an 802.11 wireless LAN. In infrastructure mode, the wireless devices communicate with each other and to a wired network by first going through an access point. An infrastructure wireless network connected to a wired network is referred to as a Basic Service Set (BSS). A set of two or more BSS in a single network is referred to as an Extended Service Set (ESS). Infrastructure mode is useful at a corporation scale, or when it is necessary to connect the wired and wireless networks.

IP (Internet Protocol) - The method or protocol by which data is sent from one computer to another on the Internet. It is a standard set of rules, procedures, or conventions relating to the format and timing of data transmission between two computers that they must accept and use to be able to understand each other.

IP Address - In the most widely installed level of the Internet Protocol (IP) today, an IP address is a 32-binary digit number that identifies each sender or receiver of information that is sent in packet across the Internet. When you request an HTML page or send e-mail, the Internet Protocol part of TCP/IP includes your IP address in the message (actually, in each of the packets if more

than one is required) and sends it to the IP address that is obtained by looking up the domain name in the Uniform Resource Locator you requested or in the e-mail address you're sending a note to. At the other end, the recipient can see the IP address of the Web page requestor or the e-mail sender and can respond by sending another message using the IP address it received.

IRQ (Interrupt ReQuest) - A hardware interrupt on a PC. There are 16 IRQ lines used to signal the CPU that a peripheral event has started or terminated. Except for PCI devices, two devices cannot use the same line.

ISM band - The FCC and their counterparts outside of the U.S. have set aside bandwidth for unlicensed use in the ISM (Industrial, Scientific and Medical) band. Spectrum in the vicinity of 2.4 GHz, in particular, is being made available worldwide. This presents a truly revolutionary opportunity to place convenient high-speed wireless capabilities in the hands of users around the globe.

LAN (Local Area Network) - A group of computers and associated devices that share a common communications line and typically share the resources of a single processor or server within a small geographic area (for example, within an office building).

MAC (Media Access Control) Address - A unique number assigned by the manufacturer to any Ethernet networking device, such as a network adapter, that allows the network to identify it at the hardware level.

Mbps (Megabits per second) - One million bits per second; unit of measurement for data transmission.

Network - A system that transmits any combination of voice, video and/or data between users.

NIC (Network Interface Card) - A board installed in a computer system, usually a PC, to provide network communication capabilities to and from that computer system. Also called an adapter.

Node - A network junction or connection point, typically a computer or work station.

Notebook - A notebook computer is a battery-powered personal computer generally smaller than a briefcase that can easily be transported and conveniently used in temporary spaces such as on airplanes, in libraries, temporary offices,

and at meetings. A notebook computer, sometimes called a laptop computer, typically weighs less than five pounds and is three inches or less in thickness.

Packet - A unit of data routed between an origin and a destination in a network.

Passphrase - Used much like a password, a passphrase simplifies the WEP encryption process by automatically generating the WEP encryption keys for Linksys products.

PC Card - A credit-card sized removable module that contains memory, I/O, or a hard disk.

PCI (Peripheral Component Interconnect) - A peripheral bus commonly used in PCs, Macintoshes and workstations. It was designed primarily by Intel and first appeared on PCs in late 1993. PCI provides a high-speed data path between the CPU and peripheral devices (video, disk, network, etc.). There are typically three or four PCI slots on the motherboard. In a Pentium PC, there is generally a mix of PCI and ISA slots or PCI and EISA slots. Early on, the PCI bus was known as a "local bus."

PCI provides "plug and play" capability, automatically configuring the PCI cards at startup. When PCI is used with the ISA bus, the only thing that is generally required is to indicate in the CMOS memory which IRQs are already in use by ISA cards. PCI takes care of the rest.

PCI allows IRQs to be shared, which helps to solve the problem of limited IRQs available on a PC. For example, if there were only one IRQ left over after ISA devices were given their required IRQs, all PCI devices could share it. In a PCI-only machine, there cannot be insufficient IRQs, as all can be shared.

PCMCIA (Personal Computer Memory Card International Association) - An industry group organized in 1989 to promote standards for a credit card-size memory or I/O device that would fit into a personal computer, usually a notebook or laptop computer.

Roaming - In an infrastructure mode wireless network, this refers to the ability to move out of one access point's range and into another and transparently reassociate and reauthenticate to the new access point. This reassociation and reauthentication should occur without user intervention and ideally without interruption to network connectivity. A typical scenario would be a location with multiple access points, where users can physically relocate from one area to another and easily maintain connectivity.

Router - Protocol-dependent device that connects subnetworks together. Routers are useful in breaking down a very large network into smaller subnetworks; they introduce longer delays and typically have much lower throughput rates than bridges.

RTS (Request To Send) - An RS-232 signal sent from the transmitting station to the receiving station requesting permission to transmit.

Server - Any computer whose function in a network is to provide user access to files, printing, communications, and other services.

Software - Instructions for the computer. A series of instructions that performs a particular task is called a "program." The two major categories of software are "system software" and "application software." System software is made up of control programs such as the operating system and database management system (DBMS). Application software is any program that processes data for the user.

A common misconception is that software is data. It is not. Software tells the hardware how to process the data.

SOHO (Small Office/Home Office) - Market segment of professionals who work at home or in small offices.

Spread Spectrum - Spread Spectrum technology is a wideband radio frequency technique developed by the military for use in reliable, secure, mission-critical communications systems. It is designed to trade off bandwidth efficiency for reliability, integrity, and security. In other words, more bandwidth is consumed than in the case of narrowband transmission, but the trade off produces a signal that is, in effect, louder and thus easier to detect, provided that the receiver knows the parameters of the spread-spectrum signal being broadcast. If a receiver is not tuned to the right frequency, a spread-spectrum signal looks like background noise. There are two main alternatives, Direct Sequence Spread Spectrum (DSSS) and Frequency Hopping Spread Spectrum (FHSS).

SSID (Service Set Identifier) - A unique name shared among all points in a wireless network. The SSID must be identical for each point in the wireless network and is case-sensitive.

Storage - The semi-permanent or permanent holding place for digital data.

Subnet Mask - The method used for splitting IP networks into a series of sub-groups, or subnets. The mask is a binary pattern that is matched up with the IP address to turn part of the host ID address field into a field for subnets.

TCP (Transmission Control Protocol) - A method (protocol) used along with the IP (Internet Protocol) to send data in the form of message units (datagram) between network devices over a LAN or WAN. While IP takes care of handling the actual delivery of the data (routing), TCP takes care of keeping track of the individual units of data (called packets) that a message is divided into for efficient delivery over the network. TCP is known as a "connection oriented" protocol due to requiring the receiver of a packet to return an acknowledgment of receipt to the sender of the packet resulting in transmission control.

TCP/IP (Transmission Control Protocol/Internet Protocol) - The basic communication language or set of protocols for communications over a network (developed specifically for the Internet). TCP/IP defines a suite or group of protocols and not only TCP and IP.

Throughput - The amount of data moved successfully from one place to another in a given time period.

Topology - A network's topology is a logical characterization of how the devices on the network are connected and the distances between them. The most common network devices include hubs, switches, routers, and gateways. Most large networks contain several levels of interconnection, the most important of which include edge connections, backbone connections, and wide-area connections.

WAN (Wide Area Network)- A communications network that covers a relatively large geographic area, consisting of two or more LANs. Broadband communication over the WAN is often through public networks such as the telephone (DSL) or cable systems, or through leased lines or satellites. In its most basic definition, the Internet could be considered a WAN.

WEP (Wired Equivalent Privacy) - A data privacy mechanism based on a 64-bit or 128-bit shared key algorithm, as described in the IEEE 802.11 standard.

WLAN (Wireless Local Area Network) - A group of computers and associated devices that communicate with each other wirelessly.

Appendix C: Specifications

Standards	IEEE 802.11b
Channels	11 Channels (USA) 13 Channels (Europe) 14 Channels (Japan)
Transmit	18 dBm
Receive Sensitivity	-82 dBm
Modulation	BPSK, QPSK, CCK
LEDs	Power, ACT
Environmental	
Dimensions	2.13" x .20" x 4.13" (54 mm x 5 mm x 105 mm)
Unit Weight	1.52 oz. (0.04 kg)
Power	3.3V DC
Certifications	FCC Part 15, Class B & Class C, Wi-Fi, WHQL XP
Operating Temp.	32°F to 104°F (0°C to 40°C)
Storage Temp.	-4°F to 158°F (-20°C to 70°C)
Operating Humidity	10% to 85%, Non-Condensing
Storage Humidity	5% to 90%, Non-Condensing

Appendix D: Warranty Information

BE SURE TO HAVE YOUR PROOF OF PURCHASE AND A BARCODE FROM THE PRODUCT'S PACKAGING ON HAND WHEN CALLING. RETURN REQUESTS CANNOT BE PROCESSED WITHOUT PROOF OF PURCHASE.

IN NO EVENT SHALL NETWORK EVERYWHERE'S LIABILITY EXCEED THE PRICE PAID FOR THE PRODUCT FROM DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OF THE PRODUCT, ITS ACCOMPANYING SOFTWARE, OR ITS DOCUMENTATION. NETWORK EVERYWHERE DOES NOT OFFER REFUNDS FOR ANY PRODUCT.

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Appendix E: Contact Information

For help with the installation or operation of the Wireless Notebook Adapter, contact Network Everywhere Technical Support at one of the phone numbers or Internet addresses below.

Technical Support	949-271-5470, M-F, 8:00 am to 5:00 pm (PST)
Fax	949-265-6655
Email	support@NetworkEverywhere.com
Web site	http://www.NetworkEverywhere.com



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